भारतीय मानक
Indian Standard

IS 3100 : 2023

वस्त्रादि — पुरुषों की ऊनी - कपास की छोटी जांघिया — विशिष्टि

(दूसरा पुनरीक्षण)

Textiles — Men's Wool — Cotton Short Drawers — Specification

(Second Revision)

ICS 59.060.10; 59.080.30

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June 2023 **Price Group 7**

Hosiery Sectional Committee, TXD 10

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards after the draft finalized by the Hosiery Sectional Committee had been approved by the Textile Division Council.

Drawers are men's underpants, short pants that men wear under their clothes, they are a garment worn over the pelvic area, circling the waist and splitting to cover the upper part of the legs, sometimes extending down to the knees but not covering the entire length of the leg.

This standard was first published in 1965, and subsequently revised in 1980. This revision has been made in the light of experience gained since its publication and to incorporate the following major changes:

a) Title of the standard has been modified;
b) The amendment issued has been incorporated; and
c) BIS Certification Marking clause has been updated.

The composition of the committee responsible for the formulation of this standard is listed in Annex C.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

TEXTILES — MEN'S WOOL — COTTON SHORT DRAWERS — SPECIFICATION

(Second Revision)

1 SCOPE

1.1 This standard prescribes the constructional details and other particulars of scoured or bleached wool-cotton, plain-knitted short drawers.

NOTE — The description 'wool-cotton' indicates that short drawers are made with worsted yarn and cotton yarn the former used in the face of the fabric and the latter plaited at the back of the fabric. The proportion of the worsted yarn and cotton yarn in the fabric shall be 55 percent and 45 percent by mass respectively.

1.2 This standard does not specify the general appearance, feel, shade, etc of the short drawers (*see* also **5.4**).

2 REFERENCES

The standards listed in Annex A contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed in Annex A.

3 MATERIAL

3.1 Worsted Yarn

The worsted yarn used for knitting drawers shall be evenly spun from 58s grade wool tops. The approximate count of yarn shall be 40 tex (Nm 25) and the single thread breaking load shall not be less than 1 225 mN (125 gf) (*see* Note 1 and Note 2).

NOTES

1 The breaking load of yarn shall be determined on a test length of 500 mm using a constant rate of traverse type machine having a traverse of (300 ± 15) mm per minute (see also IS 1670).

2 The breaking load values of yarn removed from knitted fabric shall not be less than 95 percent of the specified values.

3.2 Cotton Yarn

The cotton yarn used in plaiting of drawers shall be evenly spun. The approximate count of yarn shall be 18 s (33 tex) and the single thread breaking load shall not be less than 2 200 mN (225 gf) (*see* Note 1 and Note 2 under **3.1**).

3.3 Cotton Calico

Conforming to IS 1544.

3.4 Cotton Tape

25 mm wide and 30 cm longer than the corresponding waist girth and conforming to variety 7 of IS 1895.

3.5 Cotton Sewing Threads

Bleached, of 24s/3 (250 dtex × 3), 40s/2 (145 dtex × 2) or 60s/3 (100 dtex × 3) count and conforming to IS 1720.

4 MANUFACTURE

4.1 In shape, the drawers shall generally be as shown in Fig. 1. The drawers shall be tailored neatly out of well and evenly knitted fabric, knitted in plain stitches with worsted yarn on the face of the fabric and cotton yarn knitted inside. The wales shall run along the length of the drawer. The two halves of the garment shall be uniform in texture, shade and appearance. The drawers shall not have any seams and joining along their two sides.

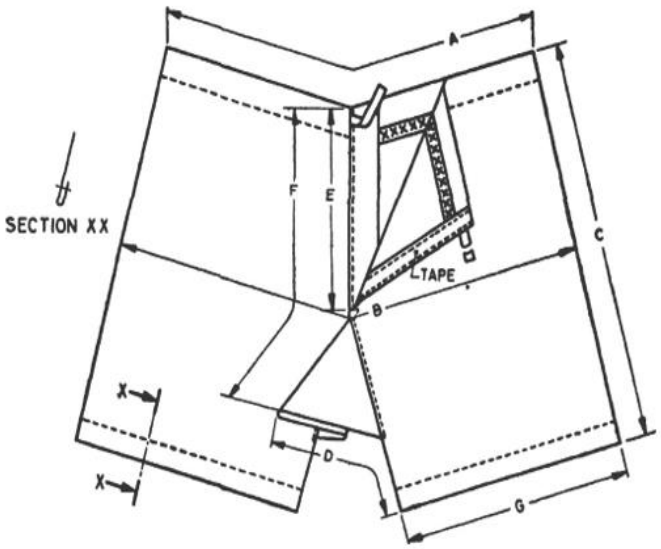

FIG. 1 DRAWERS

4.2 At the bottom of the legs of the drawers, the raw edges of the knitted fabric shall be turned into a depth of 25 mm and shall be sewn to form a hem of (25 ± 5) mm width. The stitches of the hem shall be elastic and shall not give way when the leg of the drawers is stretched to one and a half times its width.

4.3 Waist Band

At the waist of the drawers, the raw edge of the knitted fabric shall be turned into a depth of 40 mm throughout and stitched in such a manner that it is possible to insert the cotton tape through the waist band. The tape shall be stitched centrally inside the waist band at the middle of the back.

4.4 Front Opening

The front of the drawers shall be of a fly-front type. The length of the fly-front shall be in accordance with Table 1, when read with Fig. 1.

4.4.1 The bottom flap at the fly-front opening shall consist of two layers of fabrics, the outer one being knitted fabric as used for drawers and the inner layer of cotton calico. It shall be attached to the drawers with lock stitches and the joint shall be further reinforced with cotton tape. The fabric used for the bottom flap shall be of the same shade as that of the fabric used for making the drawers. The width of the bottom flap shall be 40 mm. The upper flap would be reinforced inside with cotton tape. The two flaps shall be stitched together at the bottom to facilitate opening and closing as shown in Fig. 2.

4.5 Crutch Piece

The fabric used for crutch piece shall be of the same type and construction as that of the drawers. The crutch piece shall be reinforced throughout with cotton calico. The crutch piece and the reinforcement fabric shall be scoured or bleached as the drawers.

Table 1 Dimensions and Mass of Wool-Cotton Short Drawers

(*Clause* 4.4)

Sl No.	Size	Width Across Waist, cm	Width Across Seat (Measured at the Top of The Crutch Piece), cm	Side Length, cm	Inside Leg Length, cm	Depth of Fly- Front Opening, cm	Depth of Front (Distance from Top of Waist Band to Bottom of Crutch Piece), cm	Width of Leg Opening, cm	Mass Per 10 Drawers, g (*see* Note)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		A	B	C	D	E	F	G	
i)	75	37.5	45.5	30	17	17	29	23	1 340
ii)	80	40	49.5	36	18	18	30	24	1 520
iii)	85	42.5	53.5	41	19	18	32	25.5	1 700
iv)	90	45	56	43	22	19	33	26.5	1 860
v)	95	47.5	58.5	48	24	19	34	28	2 020
vi)	100	50	61	51	25	20	36	29	2 200
vii)	105	52.5	63.5	53	27	22	37	30.5	2 380
Tolerance		± 1.0	± 2.0	± 2.0	± 1.5	± 1.5	± 1.5	± 1.5	—
Method of Test, Ref to		**B-2**	**B-2**	**B-2**	**B-2**	**B-2**	**B-2**	**B-2**	**B-4**

NOTE — A tolerance of minus 3 percent on the mass of individual drawer shall be permissible provided the average minimum mass for 10 drawers is maintained.

4.6 Seams and Stitches

4.6.1 The sewing details of the drawers shall be as under:

Sl No.	*Portion to be Stitched*	*Type of Stitch*	*Sewing Thread*
i)	Joining at the inner side of the legs, back of drawers and attaching the crutch pieces to the drawers	Three-thread overlock	Two strands of cotton sewing thread of 24s/3 count (250 dtex × 3) in the needle and primary looper and one strand of cotton sewing thread of 40s/2 count (145 d tex × 2) in the secondary looper
		or	or
		Flat Lock	Three strands of cotton sewing thread 60s/3 count (100 dtex × 3) count in the needle and one strand of sewing thread of 40s/2 (145 dtex × 2) in the needle and one strand of same sewing thread in each of the two loopers
ii)	Hemmings of waist and bottom of legs	Three-thread overlock	One strand of cotton sewing thread of 24s/3 (250 dtex × 3) count in the needle and one strand of sewing thread of 60s/3 count (100 dtex × 3) or 40s/2 count (145 dtex x 3) in each of the primary and secondary looper.
iii)	Front opening and attaching of flaps	Lock stitch	One strand of cotton sewing thread of 60s/3 count (100 dtex × 3) or 40s/2 count (145 dtex × 2) in each of the needle and the looper

NOTE — Sewing thread of 60s/3 (100 dtex × 3) may be used in place of 40s/2 (145 dtex × 2).

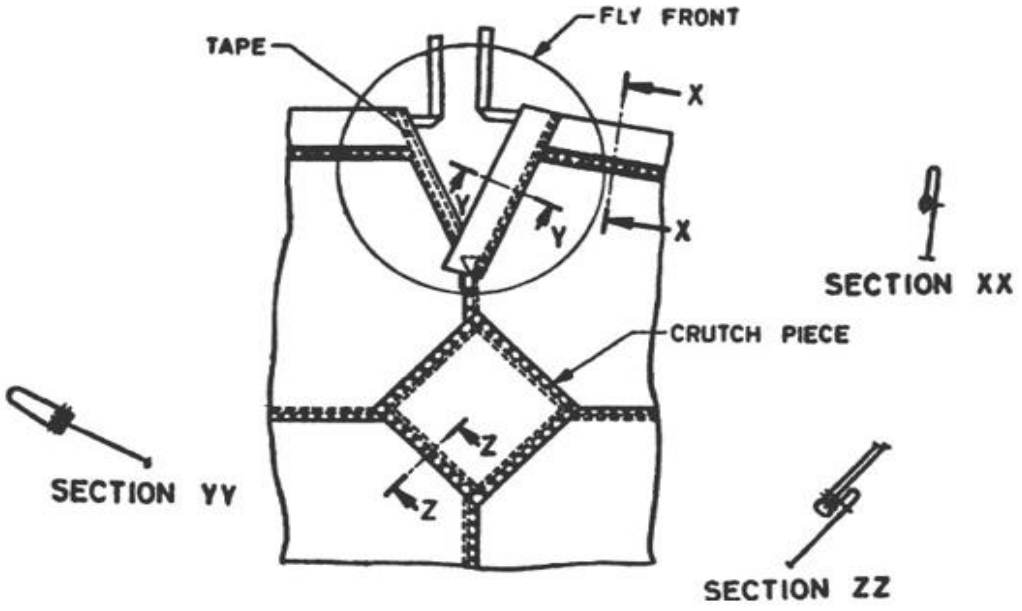

FIG. 2 DETAILS OF SEWING FLY-FRONT, CRUTCH PIECE, ETC (INSIDE)

4.6.2 The stitches shall be of even tension throughout and all the loose ends securely fastened off. The number of stitches shall not be less than 5 per centimetre. The seams and joins shall withstand stretching in all directions to the full extent of the knitted fabric.

5 REQUIREMENTS

5.1 Dimensions and Mass

The drawers shall conform to the requirements of Table 1 read with Fig. 1.

5.2 The drawers shall also conform to the requirements as given in Table 2.

5.3 The drawers shall be free from objectionable flaws. The objectionable flaws shall be those which strike immediately the eyes and shall be deemed to include:

a) Appearance of cotton yarn on the face of the fabric;
b) Noticeable broken thread in the body;
c) Large mends;
d) Ladders;
e) Dropped stitches;
f) Noticeable oil or other stains;
g) Holes, cuts or tears extending beyond 6 mm square in area;
h) Missed stitches at the stitched portion;
j) Improper reinforcement; and
k) Any other defect which would significantly mar the appearance or serviceability.

5.4 Sealed Sample

If in order to illustrate or specify the indeterminable characteristics such as general appearance, feel and type of finish, a sample has been agreed upon and sealed, the supply shall be in conformity with the sample in such respects.

5.4.1 The custody of the sealed sample shall be a matter of prior agreement between the buyer and the seller.

6 MARKING

6.1 A suitable cloth label shall be securely stitched to each piece on the inside of the waist (back side) on which the following shall be marked:

a) Name of the material, namely Wool-cotton short drawers;
b) Size;
c) Manufacturer's name, initials or trade-mark, if any; and
d) Any other information/instruction provided by the manufacturer/required under law.

6.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.

7 PRESERVATION

The drawers shall be preserved with a heavy dose of naphthalene, using a minimum quantity of 5 kilograms per cubic metre of the volume of the bale.

8 PACKING

8.1 Unless otherwise agreed to between the buyer and the seller, the drawers of the same size and shape shall be packed in a bale in accordance with IS 2518 or IS 3353, as the case may be.

8.2 Alternatively, the drawers may be packed by the method given below, when specifically agreed to between the buyer and the seller: Ten drawers of the same size and shape, folded suitably, shall be tied with twine or string to form a bundle. Five such bundles shall be wrapped with an inner layer of polyethylene film (*see* IS 2508) or kraft paper (*see* IS 1397) and an outer layer of heavy cee cloth (*see* IS 3751) or equivalent hessian cloth to form a rectangular bale. The overlaps of the inner layer shall be at least 10 cm to ensure full protection of the contents of the bale. The overlaps of the outer layer of heavy cee cloth or hessian shall be such that it can properly and securely sewn around the bale. The bale shall be stitched with double 3-ply jute twine with not less than 12 stitches per decimetre taking care not to pierce inner wrappings during stitching. Sufficient heavy cee cloth or hessian shall be pulled out at each corner to form ears of about 15 cm in length. The bale shall be made secure by fastening with at least 2 bands of steel strips (hoops) or metal wire in each direction along the length and width of the bale.

Table 2 Requirements of Wool-Cotton Short Drawers
(*Clause* 5.2)

Sl No.	Characteristics	Requirement	Method of test, Ref to
(1)	(2)	(3)	(4)
i)	Wales/dm	80 ± 4	**B-4**
ii)	Courses/dm	100 ± 4	
iii)	Dimensional change, percent, *Max*	5	**B-5**
iv)	*p*H value of acqueous extract		IS 1390
	a) Worsted yarn	5.0 - 7.56	
	b) Cotton yarn	6 - 8	
v)	Scouring loss, percent, *Max*		**B-6**
	a) Worsted yarn	4.0	
	b) Cotton yarn	3.0	
vi)	Blend composition		IS 2006
	a) Wool	(55 ± 2) percent	
	b) Cotton	(45 ± 2) percent	
vii)	Grade of wool tops	58 s or finer	IS 5911

9 SAMPLING

9.1 Lot

In any consignment all drawers of same size and manufactured from the same quality of worsted and cotton yarn shall constitute a lot.

9.1.1 The conformity of the lot shall be determined on the basis of the tests carried out on the samples selected from it.

9.2 Unless otherwise agreed to between the buyer and the seller, the number of drawers to be selected from a lot shall be according to col (3) of Table 3.

Table 3 Number of Drawers to be Selected from a Lot and Permissible Number of Non-Conforming Drawers
(*Clause* 9.2)

Sl No.	Numbers of Drawers in the Lot	Non-Destructive Testing		Destructive Testing
		Number of Drawers to be Selected	Permissible Number of Non-Conforming Drawers	
(1)	(2)	(3)	(4)	(5)
i)	up to 300	10	1	2
ii)	301 - 500	20	1	2
iii)	501 - 1 000	30	2	3
iv)	1 001 - 3 000	50	3	5
v)	3 001 and above	80	5	5

9.3 The sample size and criteria for conformity for various characteristics shall be as follows:

Sl No.	*Characteristics*	*Sample Size*	*Criterion for Conformity*
(1)	(2)	(3)	(4)
i)	Freedom from defects dimensions and number of wales and courses	All the drawers selected according to co1 (3) of Table 3	Non-conforming drawers not to exceed the corresponding number given in co1 (4) of Table 3
ii)	Mass	All the group of 10 drawers Made from those selected According to col (3) of Table 3	Each observed value to satisfy the specified requirement
iii)	*p*H value, scouring loss, relaxation shrinkage, Chromium content and colour fastness	*see* col (5) of Table 3	All the test specimens to satisfy the relevant requirements

ANNEX A
(*Clause* 2)

LIST OF REFERRED STANDARDS

IS No.	*Title*
IS 1383 : 1977	Methods for determination of scouring loss in grey and finished cotton textile materials (*first revision*)
IS 1390 : 2022	Textiles — Methods for determination of *p*H value of aqueous extract of textile materials (*third revision*)
IS 1397 : 2020	Kraft paper for packing and wrapping — Specification (*third revision*)
IS 1544 : 1973	Specification for cotton calico (*first revision*)
IS 1670 : 1991	Textiles — Determination of breaking load and elongation at break of single strand (*second revision*)
IS 1720 : 1978	Specification for cotton sewing threads (*first revision*)
IS 1895 : 1982	Specification for cotton NEWAR (*second revision*)
IS 2006 : 1988	Method for quantitative chemical analysis of binary mixtures of protein
IS 2508 : 2016	Polyethylene films and sheets — Specification (*third revision*)
IS 2518 : 1964	Code for seaworthy packaging of wool hosiery yarn and goods
IS 3353 : 1966	Code for inland packing of wool hosiery yarn and goods fibre with certain other non-protein fibres (*second revision*)
IS 3751 : 1993	Textiles — Heavy cee jute cloth — Specification (*first revision*)
IS 5911 : 1977	Fineness grades of wool tops (*first revision*)

ANNEX B
(*Table* 1 and *Table* 2)

METHODS OF TEST

B-1 CONDITIONING OF TEST SPECIMENS AND ATMOSPHERIC CONDITIONS FOR TESTING

The test specimens shall preferably be conditioned for testing and tested in the standard atmosphere as given in IS 6359.

B-2 DIMENSIONS

Take a drawer constituting the test sample (*see* **9.3**). Lay it flat on a horizontal surface. Remove all creases and wrinkles without distorting it. Measures correct to the nearest millimetre the dimensions given in Table 1.

B-3 MASS

Take a set of 10 drawers constituting the test sample (*see* **9.3**). Condition them to moisture equilibrium for 24 hours (*see* **B-1**) and weigh to an accuracy of 10 g. Also determine the mass of individual drawer.

B-4 WALES AND COURSES

B-4.1 Take a drawer constituting the test sample (*see* **9.3**). Lay it flat on a horizontal surface. Remove all creases and wrinkles without distorting it. Count with the help of a pick glass or magnifying glass, the number of wales and courses per decimetre of the fabric at five different places and calculate the average.

B-5 DIMENSIONAL CHANGE (DUE TO RELAXATION)

B-5.1 Marking of Test Specimens

Take one of the pieces from the test sample (*see* **9.3**). Mark centrally on it by means of indelible ink or a fast dyed cotton sewing thread an area 15 cm × 15 cm with two of its sides running in the direction of wales and the other two in the direction of courses. Spread this test specimen on a flat smooth surface, carefully removing by hand all creases and wrinkles. Within this area, mark six pairs of marks, three pairs each in the wales and courses direction in such a way that the distance between each pair of marks is the same.

B-5.2 Procedure

B-5.2.1 Place test specimen on a glass plate and carefully remove by hand all creases and wrinkles without stretching the test specimen and place the other glass plate on the test specimen. Measures correct to the nearest millimetre, the distance between each pair of marks separately.

B-5.2.2 Lay the test specimen flat in a water tight tray of suitable size and of depth 10 cm, *Min*. Soak it under a head of 25 mm of water containing 0.5 percent suitable wetting agent at room temperature (30 °C to 35 °C) for 2 hours. Drain out the water and remove the test specimen carefully so that it is not stretched and lay it flat on a smooth surface. Remove the excess water by absorbent material and dry it at room temperature.

NOTE — Removal of excess water by wringing the test specimen is not permitted.

B-5.2.3 After drying, condition the test specimen to moisture equilibrium at the room temperature. Place it on the glass plate, carefully remove all wrinkles and creases and place the other glass plate on the test specimen. Measures correct to the nearest millimetre, the distance between each pair of marks separately.

B-5.3 Calculation

B-5.3.1 Calculate, separately, the percentage of dimensional change both in the directions of wales and courses by the following formula:

$$Sr = \frac{(a-b)}{a} \times 100$$

where

Sr = dimensional change (due to relaxation), percent;
a = distance between a pair of marks (along the wales or courses as the case may be) before soaking; and
b = the distance between the same pair of marks after soaking.

B-5.3.2 Calculate separately the dimensional change (due to relaxation) of all the three lines in the direction of wales and courses and calculate average dimensional change (due to relaxation) in each direction.

B-6 SCOURING LOSS

B-6.1 Test Specimens

Take a drawer from the test sample (*see* **9.3**). Cut the bottom portion. Taking an end of any one of the cut and frayed loops, unravel the worsted and cotton yarn separately. Collect the yarn so removed separately into convenient bundles. Continue

unravelling till about 10 g of worsted and cotton yarn in the form of bundles are accumulated. These shall constitute the test specimens.

B-6.2 Procedure

B-6.2.1 Worsted Yarn

B-6.2.1.1 Lay the test specimen to constant mass in the drying oven at (105 ± 3) °C temperature and determine its mass accurately.

NOTE — Constant mass shall be deemed to have been reached if the difference between the two successive weighings at an interval of 20 minutes is less than 0.05 percent.

B-6.2.1.2 Extract the above specimen with a mixture of benzene and methyl alcohol in the proportion of 3 : 2 in a Soxhlet apparatus for 4 hours at the rate of 5 extractions per hour, by placing the specimen in a thimble and covering it with cotton wool previously extracted with the above stated mixture of benzene and methyl alcohol in the proportion of 3 : 2. The solvent shall then be distilled off from the extract. Dry the residue to a constant mass (*see* Note under **B-6.2.1.1**) at (105 ± 3) °C and determine the mass accurately.

B-6.2.1.3 Calculate the scouring loss of worsted yarn by the following formula:

$$\text{Scouring loss, percent} = \frac{a}{b} \times 100$$

where

a = mass of the dry residue (*see* **B-6.2.1.2**); and
b = mass of the test specimen (*see* **B-6.2.1.1**).

B-6.2.2 Cotton Yarn

Determine the scouring loss of test specimen by following the procedure prescribed for mild method in IS 1383.

ANNEX C
(*Foreword*)

COMMITTEE COMPOSITION

Hosiery Sectional Committee, TXD 10

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Amendments Issued Since Publication

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